Contents

Preface xi

Aerodynamics

Yaw modelling of small wind turbines
M.C. Ackerman (Bristol, UK) 1
Wind tunnel investigation of stall aerodynamics for a 1.0 m horizontal axis rotor
M.J. Barnsley and J.F. Wellicome (Southampton, UK) 11
A comparison between unsteady aerodynamic models
W.A.A.M. Bierbooms (Delft, The Netherlands) 23
Airfoil characteristics of rotating wind turbine blades
A. Bruining and W.A. Timmer (Delft, The Netherlands) 35
Steady and unsteady separated flows around a profile. Application on the wind turbines
D. Foussekis, P. Fraunié and C. Béguier (Marseille, France) 41
Pressure measurements and flow visualization study of a Savonius rotor
N. Fujisawa and F. Gotoh (Kiryu, Japan) 51
Computational methods for the performance prediction of HAWTs
J. Gould and S.P. Fiddes (Bristol, UK) 61
Experimental investigation of horizontal axis wind turbine dynamic stall in a wind tunnel
P. Hemon, D. Olivari and M. Wurmser (Rhode-St-Genese, Belgium) 73
Performances of vertical axis wind turbines with different shapes
M. Marini, A. Massardo and A. Satta (Genoa, Italy) 83
Parameter study of the performance of slow running rotors
R.P.P. Rijs, P. Jacobs and P.T. Smulders (Eindhoven, The Netherlands) 95
Static pressure measurements on a rotating and a non-rotating 2.375 m wind turbine blade. Comparison with 2D calculations
G. Ronsten (Bromma, Sweden) 105
New technology of power augmentation on horizontal axis wind turbines using Mie vanes
Y. Shimizu (Mie-ken, Japan), G.J.W. van Bussel (Delft, The Netherlands), S. Matsumura (Mie-ken, Japan) and A. Bruining (Delft, The Netherlands) 119
Application of a free vortex wake model to a horzontal axis wind turbine
F.J. Simoes (Campina Grade, Brazil) and J.M.R. Graham (London, UK) 129
Unsteady actuator disc model for horizontal axis wind turbines
J.N. Sørensen and A. Myken (Lyngby, Denmark) 139
Thick airfoils for HAWTs
W.A. Timmer and R.P.J.O.M. van Rooy (Delft, The Netherlands) 151
The use of the asymptotic acceleration potential method for horizontal axis windturbine rotor aerodynamics
G.J.W. van Bussel (Delft, The Netherlands) 161
New results of the study in wind turbine aerodynamics
K. Vashkevitch and V. Samsonov (Moscow, Russia) 173
Aerodynamic optimum design procedure and program for the rotor of a horizontal-axis wind turbine
Y. Zhiquan (Shantou, China), C. Zhaoxue (Lanzhou, China), C. Jingyi (Lanzhou, China) and B. Shibao (Lanzhou, China) 179
Influence of dynamic stall in the aerodynamic study of HAWTs
A. Yeznasni, R. Derdelinckx and Ch. Hirsch (Brussels, Belgium) 187

Fatigue

Load fatigue effects on a wind turbine generator in a wind farm
J.Å. Dahlberg, M. Poppen and S.E. Thor (Bromma, Sweden) 199

Wind Energy Resources

Wind energy potential in Emilia Romagna, Italy
G. Ambrosini (S. Maria di Galeria (RM), Italy), B. Benato (Verona, Italy), C. Garavaso (Verona, Italy), G. Botta (Cologno Monzese (M), Italy), M. Cenerini (Bologna, Italy), D. Comand (Bologna, Italy) and C. Stork (Bologna, Italy) 211
Description of the North Sea wind climate for wind energy applications
J.P. Coelingh (Utrecht, The Netherlands), A.J.M. van Wijk (Utrecht, The Netherlands), J.W. Cleijne (Apeldoorn, The Netherlands) and R. Pleune (Apeldoorn, The Netherlands) 221
Wind resource assessment in Sri Lanka
K.S. Fernando (Sri Lanka), E.H. Lysen (Leusden, The Netherlands), N. Pieterse (Amsterdam, The Netherlands) and J. Wieringa (De Bilt, The Netherlands) 233
Climate variability and the UK wind resource
J.P. Palutikof (Norwich, UK), X. Guo (Norwich, UK) and J.A. Halliday (Didcot, UK) 243

Near and Far Wakes

On the wind speed reduction in the center of large clusters of wind turbines
S. Frandsen (Roskilde, Denmark) 251
Engineering moles for dynamic inflow phenomena
H. Snel and J.G. Schepers (Petten, The Netherlands) 267
On the effect of the rotor geometry on the formation and the development of its wake
S.G. Voutsinas, K.G. Rados and A. Zervos (Athens, Greece) 283
Investigation of the effect of the initial velocity profile on the wake development of a wind turbine
S.G. Voutsinas, J.P. Glekas and A. Zervos (Athens, Greece) 293

Dynamic Loads and Aeroelastics

Rotor loadings on the BONUS 450 kW turbine
H. Stiesdal (Brande, Denmark) 303
Loads on a horizontal axis wind turbine operating in wake
P. Vølund (Roskilde, Denmark) 317

Modelling and Electrical Aspects

A dynamic model of the influence of turbulence on the power output of a wind turbine
Y. Sheinman and A. Rosen (Haifa, Israel) 329

Wind Models and Measurement

Turbulence measurements on top of a steep hill
I. Antoniou, D. Asimakopoulos, A. Fragoulis, A. Kotronaros, D.P. Lalas and I. Panourgias (Koropi, Greece) 343
Wind analysis on complex terrain – The case of Acqua Spruzza
G. Botta (Cologno Monzese (MI), Italy), R. Castagna (Cologno Monzese (MI), Italy), M. Borghetti (Cologno Monzese (MI), Italy) and D. Mantegna (Isernia (IS), Italy) 357
National wind resources validation in Greece
D. Kanellopoulos (Atthens, Greece) 367
Some experimental investigations on the influence of the mounting arrangements on the accuracy of cup-anemometer measurements
B. Maribo Pedersen (Lyngby, Denmark), K.S. Hansen (Lyngby, Denmark), S. Øye (Lyngby, Denmark), M. Brinch (Denmark) and O. Fabian (Denmark) 373
Estimating expected energy capture at potential wind turbine sites in Norway
T.A. Nygaard (Kjeller, Norway) 385

Design and Testing of Components

Innovative concepts for aerodynamic control of wind turbine rotors
P. Jamieson (Glasgow, UK), A. Bowles (UK), A. Derrick (UK), W. Leithead (UK) and M. Rogers (UK) 395
The delta-wing bladed rotor concept
J.A.C. Kentfield (Calgary, AL, Canada) 405
Development of a turbine to operate in the vortex field generated by a slender delta wing
G. Leftheriotis and C.J. Carpenter (Coventry, UK) 417
Comparison of different ways for VAWT aerodynamic control
V. Samsonov and P. Baklushin (Moscow, Russia) 427
The FLEXHAT program, technology development and testing of flexible rotor systems with fast passive pitch control
G.A.M. van Kuik (Amsterdam, The Netherlands) and J.W.M. Dekker (Petten, The Netherlands) 435

Author Index 449